

Groundwater case studies

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Aarhus Geophysics has vast experience in interpretation of airborne EM data for groundwater, including TDEM data collected by VTEM, SkyTEM, HeliTEM, Equator, as well as FEM (Dighem, Resolve). Figure 1 shows an interpreted resistivity section from Horn River basin, BC, Canada, acquired by SkyTEM and interpreted by Aarhus Geophysics using two different inversion approaches (smooth inversion and few-layered inversion).

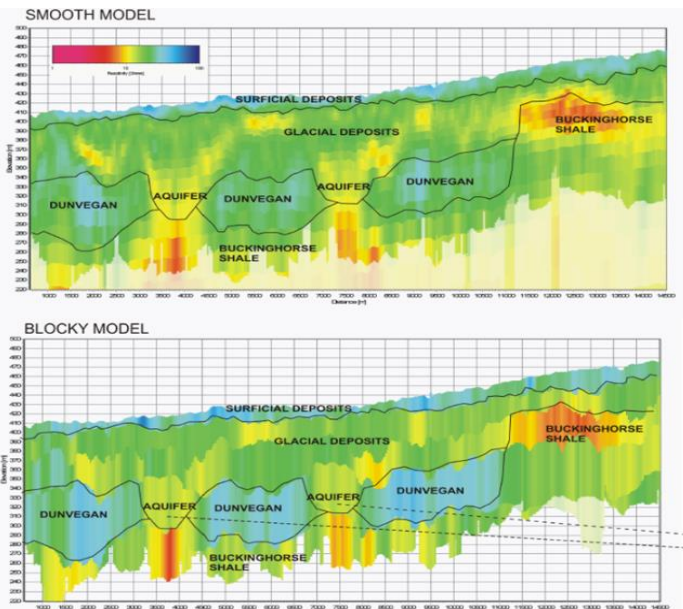


Figure 1. Interpretation of SkyTEM data collected over Horn river basin, BC, Canada.

Some TDEM systems may require recalibration for optimal modelling of the early times, which becomes crucial for groundwater interpretation. Aarhus geophysics has experience in recalibrating the TDEM data, as well as incorporating additional a-priori information (such as shallow seismic or downhole), as shown in Figure 2, where the initial interpretation suggested misleading non-existing structures.

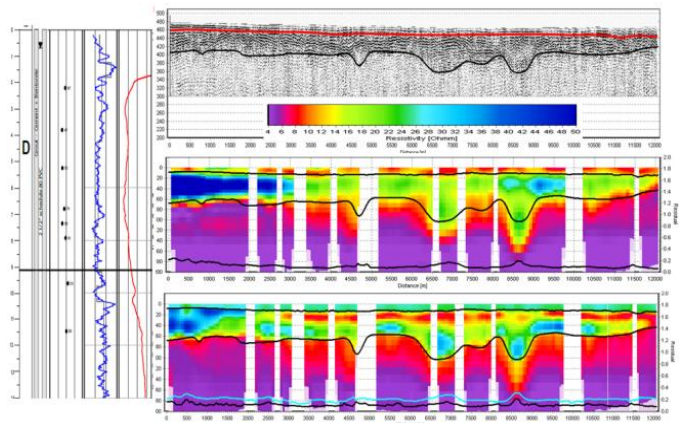


Figure 2. VTEM survey (Spiritwood valley, SK, Canada). Top: Seismic section with interpretation; middle: original VTEM inversion; bottom: recalibrated inversion; left: downhole resistivity log.

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Aarhus Geophysics is capable of delivering complete geological interpretation, with incorporated borehole data and interpreted stratigraphy, as shown in Figure 3.

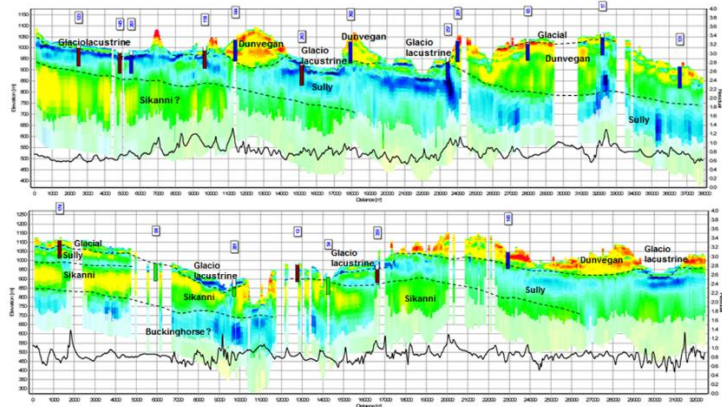


Figure 3. Geological interpretation of SkyTEM data flown in Peace river basin, BC, Canada with incorporated borehole information.

Voxel models may be constructed based on inversion results and geological interpretation, as shown in Figure 4, where reinterpreted VTEM data collected over Spiritwood valley, MB, Canada were used to construct a 3D pseudo-lithological volume.

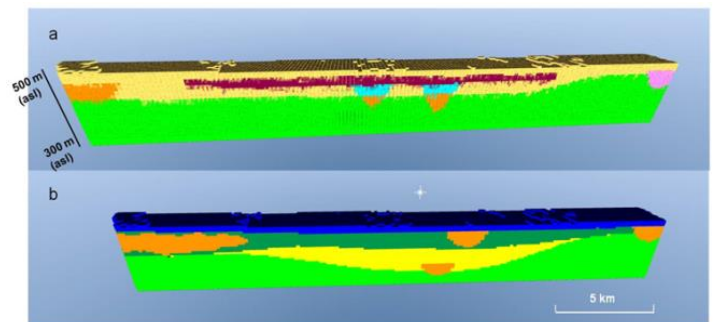


Figure 4. Top: Voxel model constructed from updated waveform with a-priori (ERT) information incorporated. Bottom: voxel model based on original VTEM inversion results

The inversion results may be also interpreted with regards to water quality (salinity, TDS content, etc.), as shown in Figure 5.

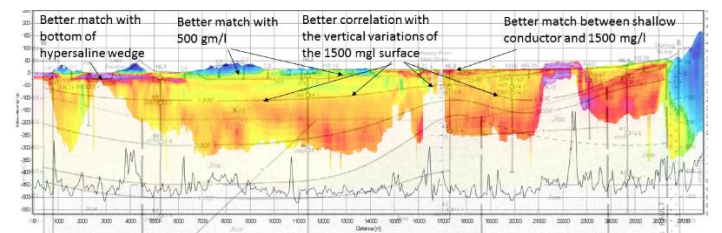


Figure 5. Interpreted inversion of SkyTEM data collected in Australia as a part of government initiative (DOW) targeting groundwater resources and their quality (isolines represent TDS content levels).